6.0 FIVE-YEAR REVIEW SUMMARY OF FINDINGS

The primary purpose of this five-year review is to evaluate whether the remedial action selected for the Kellogg-Deering Site -Operable Unit No. 1 (air stripper) remains protective of public health and the environment. As presented in Tables 5-1 and 5-2, available sampling and analytical data indicate that the air stripper continues to achieve 100 percent removal of the tested volatile organic compounds (to "not detected" levels, where the detection limit is 0.5 to 1.0 ug/l). The stripper, therefore, continues to be protective of the public which relies on this water supply. (It should be noted that the "effluent" samples are collected following treatment with chlorination, etc., just prior to distribution, as recommended by the State; the results may not be representative of effluent directly exiting the air stripper.) Some low levels of trihalomethane (THM) compounds (chloroform, chlorodibromomethane, bromodichloromethane, and bromoform) have been detected in effluent samples, however, these compounds are commonly associated with chlorinated treatment processes of water supply systems. As presented in Table 5-1, the levels detected are significantly lower than the Connecticut drinking water limit for THM compounds which is 100 mg/l for total THMs.

Ongoing maintenance activities of the air stripping facility, as discussed in Section 5.0, appear to be satisfactory. No deterioration of performance of the air stripper is evident. Recommendations from an inspection by Hydro Group have reportedly been implemented (see Appendix A-3). NFTD noted that the District uses Hydro Group's "Packed Column Air Stripper Instructions and Maintenance" manual and expects to contact Hydro Group every three years to conduct a thorough inspection of the air stripper system, including cleaning or replacement of the packing, if necessary. If breakthrough of VOCs is noted in the effluent sample results between three-year inspection intervals, it is suggested that Hydro Group be contacted at that time to conduct an inspection of the air stripper facility, with annual inspections thereafter, if necessary.

The major area of noncompliance with requirements which were specified in the 1986 ROD and 1987 Administrative Order is that NFTD is not conducting groundwater sampling of monitoring wells on the east side of the Norwalk River. The purpose of this requirement was to provide an "early warning system" for the detection of potential high level contaminants which may be migrating toward the well field.

A provision for offsite quarterly sampling of the seven monitoring wells recommended in the ROD (wells 6M, 6D, K2A, K2B, K-8 (or MW3), 15, and 15R) and a request for keys to the wells was included in NFTD's "Monitoring and Sampling Program" and cover letter submitted to EPA on June 23, 1987. However, according to NFTD, the District

has conducted no sampling of monitoring wells, it has no keys to the wells, and it does not know the condition of the wells, which are located on other private properties.

The Administrative Order/Remedial Action Plan required that a contingency plan be submitted to EPA that includes measures to be taken in the event that a highly contaminated slug of groundwater (indicated by a level of trichloroethylene (TCE) above 5,000 ug/l at the closest monitoring well east of the river) is detected moving toward the well field. However, the levels of TCE and other VOCs detected in the untreated well field groundwater samples have remained significantly lower than this and appear to be decreasing since 1987 levels. Therefore, the groundwater sampling of offsite monitoring wells may not be necessary.

Also required in the Remedial Action Plan was the submittal of a Quality Assurance/Quality Control (QA/QC) plan for all monitoring requirements. Based on information available from EPA and NFTD, a QA/QC plan has not been developed. QA/QC samples such as duplicates and blanks are not collected and data validation such as review of holding times is not being conducted, based on available information. However, the laboratory analyzing the NFTD's VOC samples, Environmental Laboratories, Inc. in New Haven, Connecticut is certified by the State of Connecticut Department of Health Services (DOHS) for the analysis of organics in drinking water. The quality of public water supplies in the State of Connecticut is insured through regulations and procedures enforced by the Connecticut DOHS.

It should be noted that the Layne 1 well has not been utilized for a water supply since its initial deactivation prior to 1987, due to high levels of iron, manganese, TCE, and turbidity. A replacement well for Layne 1 is currently being installed and tested and may be operational in early 1993, contingent upon State approval. The State DOHS has approved an increased volume for treatment through the air stripper, based on lower than expected levels of TCE present in the influent.

In summary, the air stripping facility being utilized to treat the NFTD public water supply continues to protect human health and the environment. Minor areas of deficiency with respect to the requirements of the Administrative Order and ROD are discussed above, however, based on the 100 percent removal efficiency being maintained by the air stripper facility, no major recommendations are necessary at this time.

APPENDIX A

APPENDIX A-1

"Exemption Letter"
Letter from Connecticut DEP to First District
Water Department Norwalk, Connecticut
July 28, 1988

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

July 28, 1988

Mr. Brian F. Fitzgerald
General Supervisor
First District Water Department
3 Beden Avneue
Norwalk, Connecticut 06852

Dear Mr. Fitzgerald:

This letter is to inform you that the Department has completed the evaluation of your application, for permits to construct and operate an Induced Draft Air Stippping Column VOC Removal for the Smith Well Field.

Pursuant to Section 22a-174-3(a)(1) of the "Administrative Regulations for the Abatement of Air Pollution," permits for construction and operation of new or modified stationary sources are required. However, pursuant to Section 22a-174-3(a)(2) of the Regulations (revised October 1, 1982) "permits shall not be required for any stationary source..whose emissions of each air pollutant after the application of air pollution control equipment and where the emission rate is calculated using the maximum rated capacity would be less than forty (40) pounds per day and less than five (5) tons per year."

It is the opinion of this Department that the emissions from the above source, as described in the application, will be less than the above limits. Permits to construct and operate are therefore not required for this source at this time. If the above source is ever modified in such a manner as to result in an emission rate greater than forty (40) pounds per day and five (5) tons per year, of any pollutants, permits will be required at that time. This exemption will become void if any of the design or operating parameters listed on the above mentioned application are varied resulting in a modification as defined in Section 22a-174-1 of the Regulations:

Water Flow Rate: 1750 gals/minute
Concentration: 0-600 ppb or 0.6 ppm
Solvent Catalyst: Trichloroethylene
ACFM: 23,000

Mr. Brian F. Fitzgerald
John W. Anderson
First District Water Dept. Exemption

July 28, 1988

This letter in no way grants immunity from legal action resulting from the failure of this source to remain in compliance with existing air pollution regulations nor does it exempt the aforementioned device from compliance with future Federal, state or local legislation.

Please be advised that you will be receiving a permit fee refund check for $50.00 in approximately 4-6 weeks.

If you have any questions, contact Mr. Rajendra P. Jain, the engineer who evaluated your permit application, by calling 566-8230.

Sincerely yours,

John W. Anderson
Deputy Commissioner

JWA/emw

APPENDIX A-2

Inspection Report of Norwalk First District
Water Department Conducted by State of Connecticut
Department of Health Services
September 6, 1988

mailed 10/19/88

STATE OF CONNECTICUT
DEPARTMENT OF HEALTH SERVICES

NAME: Mr. Brian Fitzgerald

DATE: October 19, 1988

ADDRESS: 3 Belden Avenue, Box 27
Norwalk, CT 06852

TOWN: Norwalk

UTILITY: Norwalk First District Water Department

(X) For your information.

( ) Please note special recommendations.

( ) Resampling requested.

(X) For necessary action.

(X) Remarks. The utility is urged to examine all the recommendations of this report and attempt to correct them as soon as possible. Implementaion of items 1,8, and 9 is required immediately. A plan of action addressing each recommendation and the utility's remediation response should be prepared and forwarded to this office by December 16, 1988.

JC/lel

cc: Louise S. Leary, R.N., Director of Health
137-139 East Avenue, Norwalk, CT 06851

John W. Czaja
Senior Sanitary Engineer
Water Supplies Section

566-1253,
Phone.
150 Washington Street — Hartford, Connecticut 06106
An Equal Opportunity Employer

October 19, 1988

SUBJECT: NORWALK, CT: INSPECTION OF THE KELLOGG-DEERING WELL FIELD FACILITIES OF THE NORWALK FIRST DISTRICT WATER DEPARTMENT-NFDWD ON SEPTEMBER 6, 1988.

Brian Fitzgerald
3 Belden Avenue, Box 27
Norwalk, CT 06852

cc: Louise S. Leary, R.N.
Director of Health
137-139 East Avenue
Norwalk, CT 06851

From: John W. Czaja
Senior Sanitary Engineer
Water Supplies Section

INSPECTED WITH: Brian Fitzgerald, General Supervisor, NFDWD
William G. Lahey, Chief Operator, NFDWD

SYSTEM DESCRIPTION:

The NFDWD's Kellogg-Deering well field is located between Spring Hill Avenue and the Norwalk River. The well field facilities comprise 3 active wells (i.e. Layne 2-L2, Deering 1-D1, and Deering 2-D2), 2 inactive wells (i.e. Layne 1-L1 and Smith Caisson), a packed column aeration tower, 750,000 gallon inground cement clearwell, a pump station, and treatment station.

The 3 active wells are manually controlled at the wellfield to pump into the top of the aeration tower. Water flows by gravity through the aeration tower to the 750,000 clearwell. The pump station is located on top of the clearwell and consists of 3 parallel transfer pumps (i.e. 2-1.8 MGD and 1-2.5 MGD) and controls. The transfer pumps are controlled either at the wellfield or at the filter plant to pump water through the wellfield's treatment station and into the distribution system. In the treatment station the water main discharging to the distribution system is injected with chlorine, hydrofluosilic acid, and zinc polyphosphate. Also, located in the treatment station are the controls for the wells, a venturi meter used to measure the wellfield's production and to pace the proportional flow chemical feed pumps, 2 diesel generators which would power all the equipment in the wellfield with the exception of wells D1 and D2, and pH adjustment equipment (sodium hydroxide) which presently is not used.

WATER QUALITY:

There were no water samples collected at the NFDWD at the time of inspection.

The water quality analyses received from the NFDWD for the past two years indicate that the water quality of the wellfield's treatment effluent and water within the distribution system has met the potable water standards as set by the State of Connecticut.

The 1988 raw water analyses for active wells D1, D2, and L2 indicate levels of trichloroethylene in excess of the maximum contaminant level (MCL) of 5 µg/l. In addition trans 1, 2 dichloroethylene, 1,1,1 trichloroethane, and 1,1 dichloroethane have been detected. The aeration tower removes these compounds down to non detectable limits based on current quantification levels. The inactive well L1 also contains these compounds but is currently not used due to excessive iron and manganese levels. The May 24, 1988 chemical analysis for the blend of wells D1 and D2 indicates manganese at a level higher than the Federal recommended limit of 0.05 mg/l.

NORWALK, CT: INSPECTION KELLOGG-DEERING WELL FIELD FACILITIES OF THE NORWALK FIRST DISTRICT WATER DEPARTMENT - NFDWD ON SEPTEMBER 6, 1988.

CONCLUSIONS AND RECOMMENDATIONS:

1) Wells D1 and D2 should be resampled for manganese since the May 24th levels were high. These excessive levels may cause problems with the aeration tower's packing and within the distribution system.

2) The old wood slot tower must be physically disconnected from well L2. A means to plug the pipe other than the valve should be used.

3) The NFDWD must make all efforts to obtain ownership or easement for the 200' protective radius of each well. This requirement is a regulation stated in section 19-13-B51d of the CT Public Health Code.

4) Each sanitary well seal must be provided with a screened vent and the seal should have no other openings. The vent should consist of a pipe extending through the sanitary seal and sealed therein watertight. The upper end of the vent pipe must be above any possible high water mark and either be downturned and screened or provided with a mushroom type vent.

5) An updated map of the piping in the well field should be submitted to this office. The map should show all blowoffs and valves.

6) The overflow located in the clearwell must be provided with a screen.

7) The hydrofluosilic and caustic day tanks are vented outside of the building. One of these vents was broken. The broken vent must be repaired and screens installed on the down turned ends.

8) The chlorine gas detection equipment which the NFDWD indicated as just recently being purchased must be installed immediately. The detector should be mounted near the floor and both an audible and warning light alarm mechanisms should be located outside the building. There should be no openings in the floor of the chlorine room since the denser chlorine gas would fill the treatment room located downstairs.

9) The treatment station must be provided with rubber gloves, an apron or other protective clothing, and goggles or face mask. The employees should be trained and required to use these protective devices.

10) A deluge shower and/or eyewashing equipment should be installed at the treatment station.

11) The NFDWD should have the old electric transformers inspected for leaks and determine if they contain PCB. If found to contain PCB they should be replaced in the near future.

12) A letter from this office dated October 11, 1988 was sent to the NFDWD discussing the water quality monitoring and operation of the aeration tower. The schedule of monitoring should be implemented and the results submitted to this office.

13) The blowoffs for the wells discharge into the Norwalk River and was indicated by the NFDWD as having a clapper at the discharge end. The utility should consider extending the discharge pipes upward above the 100 year flood level with the top ends elbowed down and screened. The existing arrangement may allow water to enter past the clapper and against the gate, which may leak, when the level of the river rises.

14) The NFDWD should consider installing controls for the automatic switching on and off of the wells and aeration tower based on levels in the clear well.

15) The pump curve for each well and each booster pump as well as at what pressures they operate should be submitted to this office.

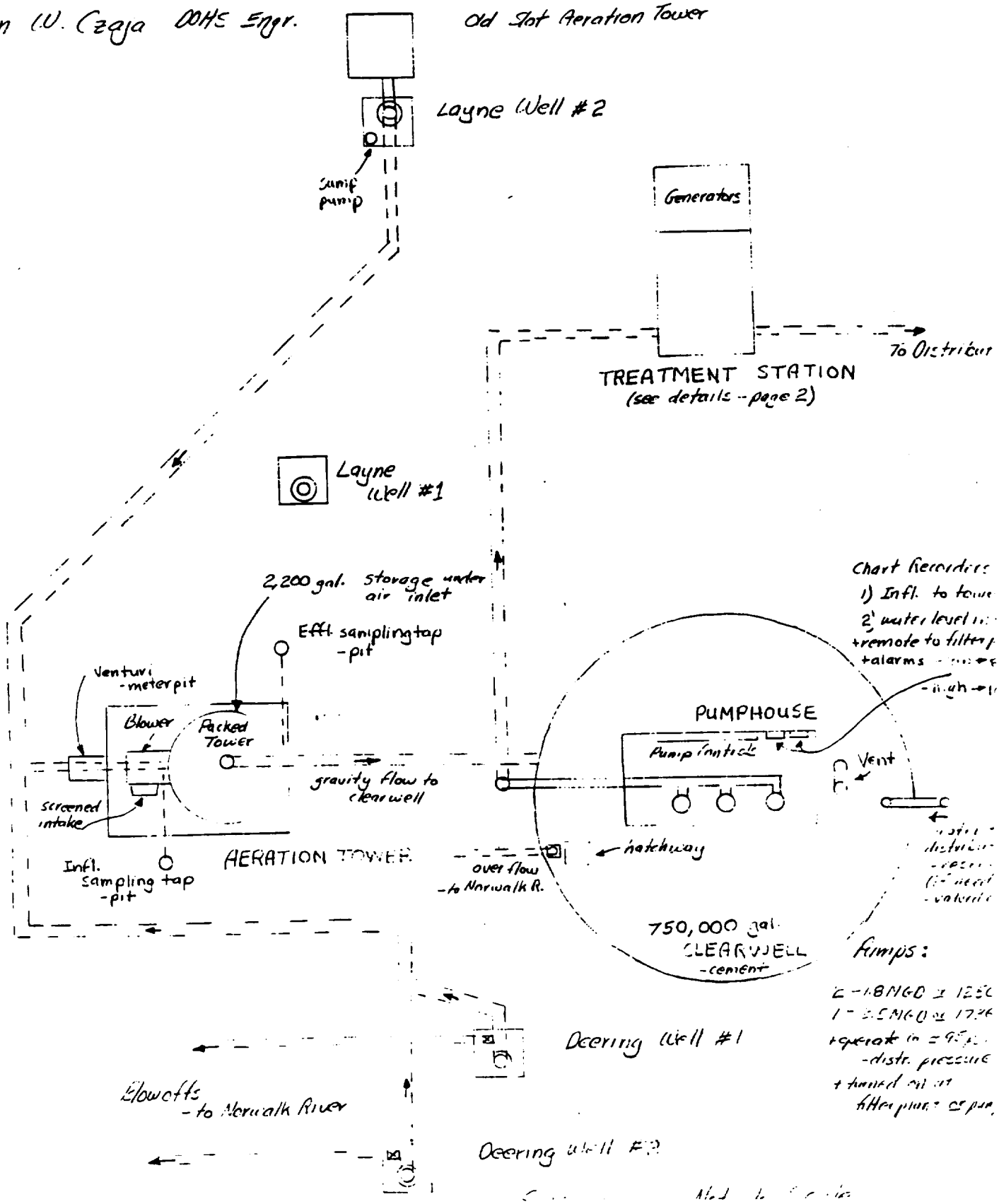
16) The transfer pumps should be equipped with low level shutoffs.

JWC/es
5944E

9-6-88

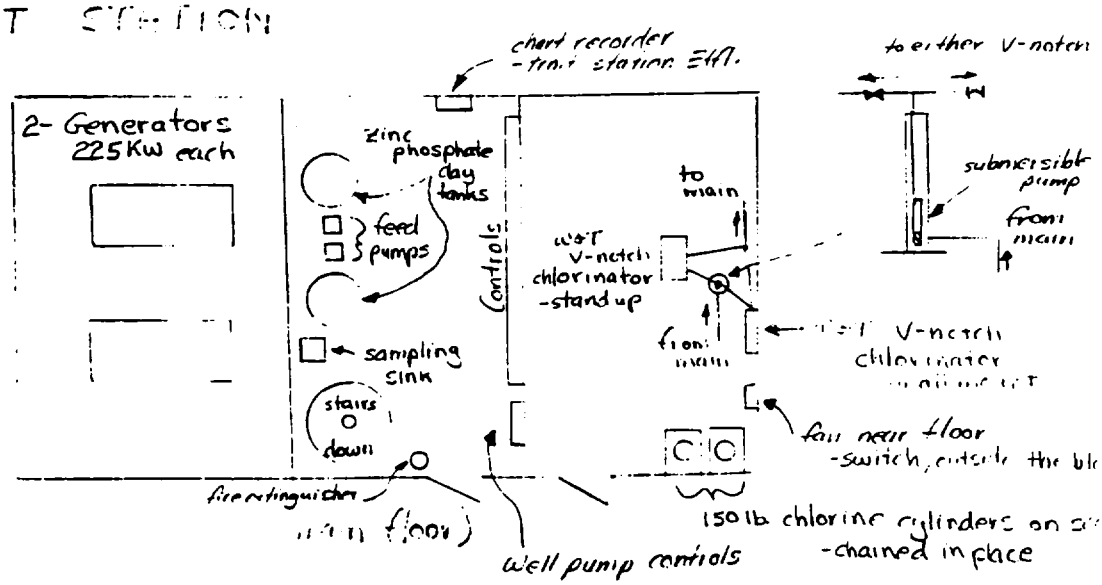
Norwalk - First Taxing District

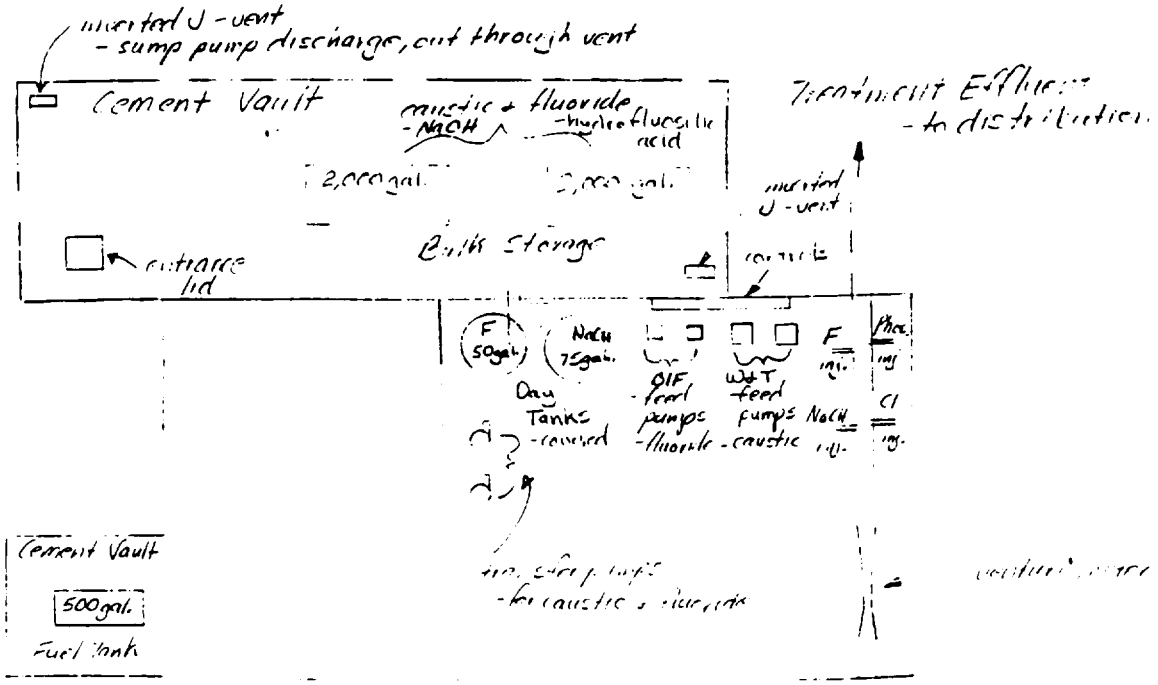
John W. Czaja OOHS Engr.



Norwalk - First Taxing District
John W. Czaja DOHS Engr.

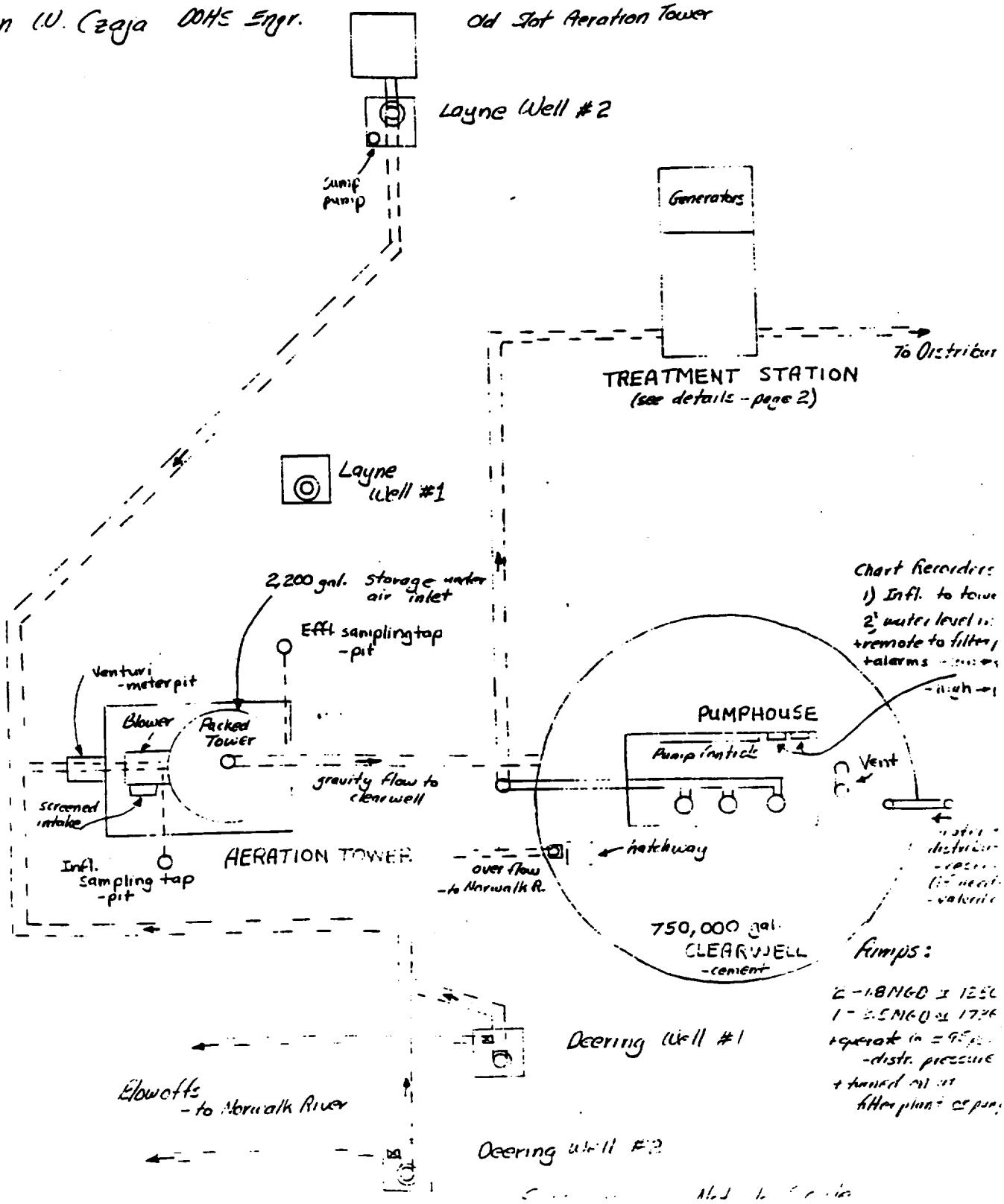
TREATMENT STATION





Norwalk - First Taxing District

John W. Czaja OOHS Engr.



9-6-88

FACILITY: Norwalk First District Water Department NFDWD

INSPECTED WITH: Brian Fitzgerald
Bill Lahey

INSPECTED BY: John [illegible]

SOURCE INFORMATION

DATE OF LAST CROSS CONNECTION INSP. 1987 [illegible] reviewed

SYSTEMATIC FLUSHING: not reviewed

DATE OF LAST WTSHD. INSP. REPT. 1987

INTERCONNECTIONS: 5 with BHC
8 with Norwalk Second District WD

SOURCE		COMMENTS	WELL: METERED	WELL: TYPE	WELL: DIAM. (1) inch	WELL: DEPTH feet (1)	PUMPING CAPACITY MGD/GPM 24hr.	SAFE YIELD MGD 1980 study: Leggette Brashears Graham	DIST. TO NEAREST SOURCE OF POLLUTION	TYPE OF
Laune 2	L2 (Active)	pit	one meter at treat. station	gravel packed	20	100'	1.4 / 972	(3)		
[illegible] 1	D1 (Active)	pit		"	20	84'	0.5 / 347			
[illegible] 2 (2)	D2 (Active)	pit		"	20	65'	1.4 / 972			
						Tot.	3.3 / 2291	3.5		
Laune 1	L1	pit Not in use: high iron & manganese		"	20	90				
Walter [illegible] Smith		Caisson - Not inspected; not used			86					

NOTE: SURFACE SUPPLIER - REVIEW POSTING, FENCING, ETC. - MAKE COMMENTS BELOW.
TREATMENT (SEE ATTACHED SHEETS/~~NONE~~)

DISTRIBUTION

BOOSTER STATIONS: ________

EST. POPULATION SERVED	YEARLY AVE. DAILY CONSUMP. (GPD)	PER CAPITA CONSUMP. (GPCD)	EST. SAFE YIELD OF PRESENT SOURCES (GPD)	MAX. HR. DEMAND (GALS.)	GALS. AVAIL. MAX. HR.	NO. OF SERVICES	NO. OF METERS	STORAGE TANKS QTY./SIZE	TYPE OF STORAGE PRESS./ATM.	TRANSFER PUMPS QTY
			3.5 MGD					750,000	clearwell atm.	[illegible]

COMMENTS: (1) The 750,000 clearwell's leaks were repaired [illegible] vent around it

(1) [illegible] water supply plan.
(2) [illegible] were all redeveloped in 1986
(3) wells are throttled. data obtained from [illegible] NFDWD [illegible]

9-6-88

UTILITY/SOURCE(S): Norwalk - First Taxing District / Layne #2 and/or Deering #1 & #2 (blend)

INSPECTED WITH: Brian Fitzgerald and Bill Lahey

RATE OF WATER FLOW: vertical turbine → 1.8 MGD or 2.5 MGD - from clearwell

STAND BY POWER/CONDITION: yes / 2 diesel 225 KW each / good / under service contract
- will power everything except Deering #1 & #2 (not elec. operated)

TYPE OF FEEDER: W+T V notch 2 on hand - standup + wall mount types
ALTERNATE: parts
*RATE OF DOSAGE: (SPECIFY) 2.5 lbs / MG 0.3 ppm
POINT OF INJECTION: basement of treatment station - after flow meter
SAMPLING POINT: sink @ front station - from clear FREQUENCY OF TESTING: daily
TESTING EQUIPMENT/CONDITION: was not checked
SAFETY EQUIPMENT (TYPE & CONDITION): - Scott pack - pressure tank in plant
SCALES: yes - each cyl on separate scale AMT. & KIND OF CHEM. ON HAND: 2 - 15 lb. cyls
COMMENT: * No chlorine detector, they have one to install!
Fan in room with exterior switch, fan mounted on wall near floor - OK

TYPE OF FEEDER: (2) - B/F - proportional to flow, paced on flow meter in station
ALTERNATE: parts
*RATE OF DOSAGE: (SPECIFY) 50 gal. day tank - 25% sodium fluoride solution
POINT OF INJECTION: same as above
SAMPLING POINT: same as above FREQUENCY OF TESTING: daily
TESTING EQUIPMENT/CONDITION: tested @ filter plant
SAFETY EQUIP. (TYPE & CONDITION): none
SCALES: day tank on balance scale AMT. & KIND OF CHEM. ON HAND: 2,000 gal bulk storage (steel tank - rubber lined)
50 gal. day tank
COMMENT: 25% hydrofluosilicic acid (sodium)

TYPE OF FEEDER: 2 - feed screws - prop. to flow (same as flow #'s)
ALTERNATE: one
*RATE OF DOSAGE: (SPECIFY) 2 lbs mixed in 50 gal day tank, 1 ppm
POINT OF INJECTION: same as above
SAMPLING POINT: same as above FREQUENCY OF TESTING: weekly
TESTING EQUIPMENT/CONDITION:
SAFETY EQUIP. (TYPE & CONDITION:
SCALES: AMT. & KIND OF CHEM ON HAND:
COMMENT:

GENERAL COMMENTS:

Comment on Records:

Chlorine Gas: Check to see that injector is greater than main press. [illegible]
Cl gas cylinder press. Check cylinder arrangement.

UTILITY/SOURCE(S): Norwalk - First Taxing District

INSPECTED WITH:

RATE OF WATER FLOW:

STAND BY POWER/CONDITION:

NOT IN USE :

TYPE OF FEEDER: 2-Wd T prop. to flow, paced on flow meter

ALTERNATE: none

*RATE OF DOSAGE: (SPECIFY) * not in use since aeration tower went online - raises pH

POINT OF INJECTION: same as point 1

SAMPLING POINT: same as point 1 FREQUENCY OF TESTING: daily - was not checked

TESTING EQUIPMENT/CONDITION: was not checked

SAFETY EQUIPMENT (TYPE & CONDITION): none * steel tank - either

SCALES: day tank on balance scale AMT. & KIND OF CHEM. ON HAND: 75 gal. bulk storage

COMMENT: 75 gal day tank

50% NaOH - no dilution

TYPE OF FEEDER:

ALTERNATE:

*RATE OF DOSAGE: (SPECIFY)

POINT OF INJECTION:

SAMPLING POINT: FREQUENCY OF TESTING:

TESTING EQUIPMENT/CONDITION:

SAFETY EQUIP. (TYPE & CONDITION):

SCALES: AMT. & KIND OF CHEM. ON HAND:

COMMENT:

TYPE OF FEEDER:

ALTERNATE:

*RATE OF DOSAGE: (SPECIFY)

POINT OF INJECTION:

SAMPLING POINT: FREQUENCY OF TESTING:

TESTING EQUIPMENT/CONDITION:

SAFETY EQUIP. (TYPE & CONDITION:

SCALES: AMT. & KIND OF CHEM ON HAND:

COMMENT:

GENERAL COMMENTS:

Comment on Records:

Chlorine Gas: Check to see that injector is greater than main press.
Cl gas cylinder press. Check cylinder arrangement.

INSPECTI N OF
AIR STRIPPING/GAC FILTRATION/PRESSURE FILTRATION FACILITIES

Date: 9-6-86

UTILITY: Norwalk First District Water Dept.
INSPECTED WITH: Brian Fitzgerald + Bill Lahey INSPECTED BY: John M. Grija
STANDBY POWER/CONDITION: yes/good FREQUENCY EXERCISED/UNDER LOAD: under service conditions - unknown

AERATION TOWER

COLUMN HEIGHT: 36' WIDTH: 11' PACKING DEPTH: 23'
TYPE OF PACKING: No. 1 Jaeger Tripacks PROPER SCREENING: yes
TYPE/SIZE OF BLOWER (cfm/Quantity): 29,000 cfm
RATE OF WATER FLOW: 1750 (approval given 10-11-88 for 2600 gpm)
MAXIMUM RATE OF WATER FLOW (Design): 1750 AIR TO WATER RATIO: 27.5 : 1
CHLORINATION POINT: after clearwell SAMPLING LOCATION: infl. and effl. of tower
CLEARWELL SIZE: 750,000
BOOSTER PUMPS CAP./QUANTITY: 2-1.6 MGD and 1-2.5 MGD
COMMENT: tower looked in good condition (levels of VOC's not known)

GAC/PRESSURIZED FILTER

TYPE OF FILTER:
CARBON: MANUFACTURER: CARBON MEDIA I.D. NO.
PREFILTER/DESCRIPTION:
RATE OF WATER FLOW: MAXIMUM RATE OF WATER FLOW (Design):
AMOUNT OF MEDIA (ft^3): SURFACE AREA OF FILTER (ft^2):
CONTACT TIME (Max.): (Min.):
FLOW RESTRICTION DEVICE:
FILTER FLOW SCHEMATIC (include source, filters, sampling tap, meters and storage):

FREQUENCY OF MEDIA REPLACEMENT: DATE OF LAST MEDIA REPLACEMENT:
HOW IS MEDIA REPLACEMENT DETERMINED:
BACKWASH CAPABILITIES (Yes/No) FREQUENCY:
BACKWASH RATE: WHERE DISCHARGED:
DEP DISCHARGE PERMIT #:
SAMPLING LOCATION: SAMPLING FREQUENCY (Filter Effl.):
COMMENT:

PK/ch (ee)

APPENDIX A-3

Tower Inspection Report for Deering Well Field
First Taxing Water District, Norwalk, Connecticut
Conducted by Hydro Group, Inc., Environmental Products Division
April 12, 1989

HYDRO GROUP®

ENVIRONMENTAL PRODUCTS DIVISION

May 1, 1989

Mr. Brian Fitzgerald
First Taxing District Water Department
3 Belden Avenue
Norwalk, CT 06850

Re: Tower Inspection
Deering Well Field

Dear Mr. Fitzgerald:

Enclosed is the tower inspection report conducted by Hydro Group at the Deering Well Field site on April 12, 1989.

Based on manufacturer's blower curves, the static pressure measured correlates to 27,000 cfm of air resulting in an air to water ratio of 165:1. These parameters are certainly within range of normal tower operation.

The trichloroethylene concentration was reduced from 33 ug/l to below detection. These results were found using Hydro Group's gas chromatograph onsite.

Sincerely yours,

HYDRO GROUP, INC.
Environmental Products Division

Toby J. Frielinghaus.
Engineer

TJF/mey
enc.

TOWER INSPECTION

FIRST TAXING WATER DISTRICT
NORWALK, CT

1. Blower RPM 1750 (Motor); 758 (blower)

2. Water flow 1.76 MGD = 1222 gpm

3. Check packing at bottom of tower: Packing discolored - reddish-brown due to iron. No substantial visible buildup.

4. Check basin: Walls covered with light brownish iron color. Bottom pitted and blackish-brownish. One square ft. = 120 pits. Sidewall - 7 per sq. ft.

5. Blower Pressure: 3.4 inches

6. Trichloroethylene concentrations using Hydro Group G.C. onsite:

Raw	33	ppb
Effluent	ND	ppb (Non Detect)
% Removal	100%	

7. Comments: Blower - flexible neoprene boot needs to be replaced. Housing should be repainted. Changed gasket material.

   No apparent leaks around base of tower or riser pipes.

   Bottom of sidewalls up to blower should be sandblasted and coated with high build epoxy.

INSPECTED BY: [signature]

DATE: 4/12/89

TIME: 11 - 3